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Dammert et al.

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[54] **MAGNETIC ARMATURE MOUNTING IN PARTICULAR FOR MINICOMPACT RELAYS**

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[52] **U.S. Cl.** **335/276;** 335/274; 335/203
[58] **Field of Search** 335/276, 274, 128, 202, 335/203, 194

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[57] **ABSTRACT**

A mounting for a magnetic armature intended particularly for minicompact relays and provided with a housing encasing a magnetic coil, a magnetic armature and a spring is angled and held tiltably against the magnetic yoke by means of its spring force. The spring force is applied to the yoke by the flat spring strip freely inserted into the housing of the relay, which for this purpose is supported under prestress with its front side ends abutting the walls of the housing or with one end abutting the wall and with the other end abutting the switch spring or the switch spring and a switch spring support and/or contact and a contact spring support, while abutting, at its bend on the magnetic armature.

9 Claims, 6 Drawing Figures

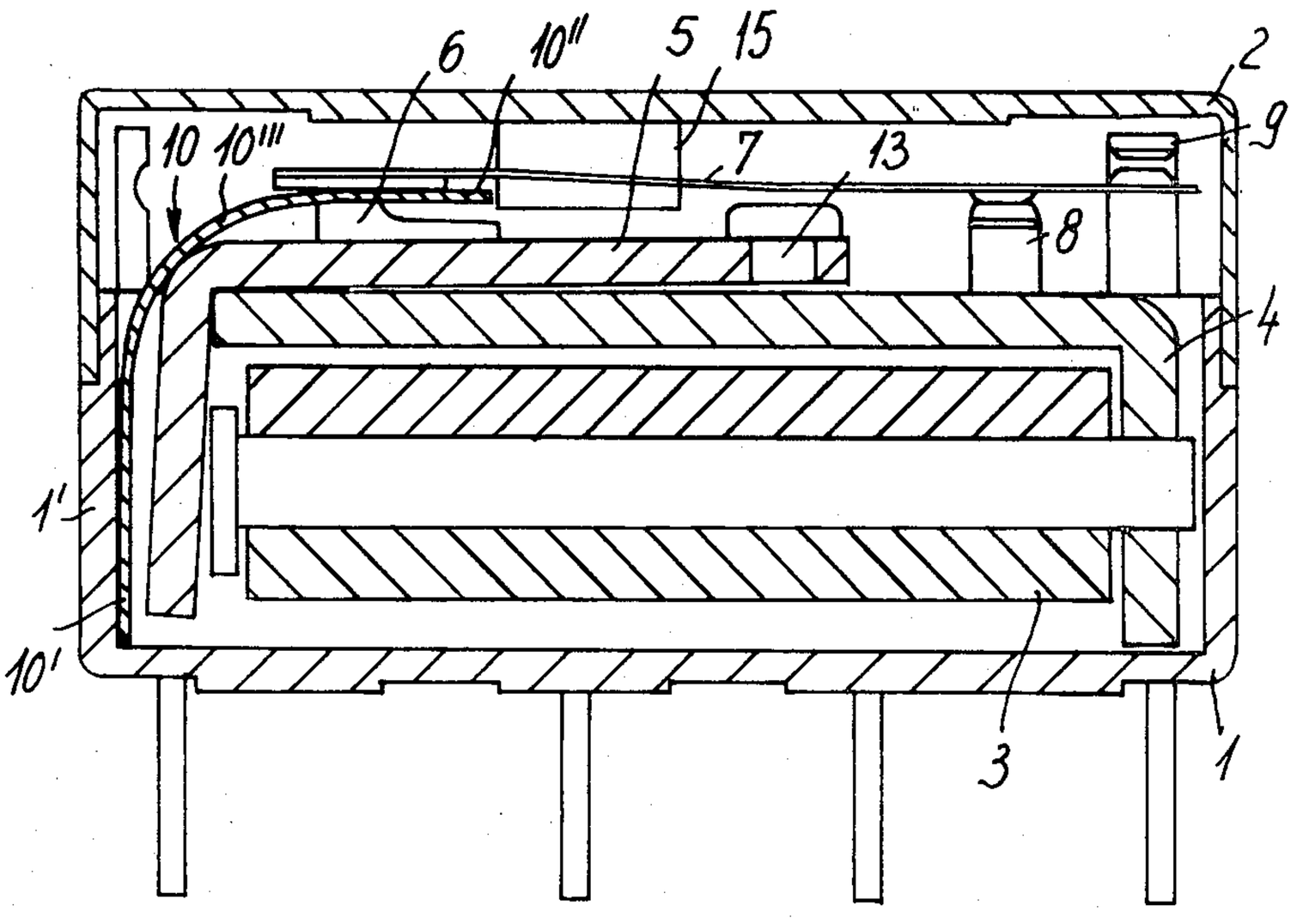


Fig. 1

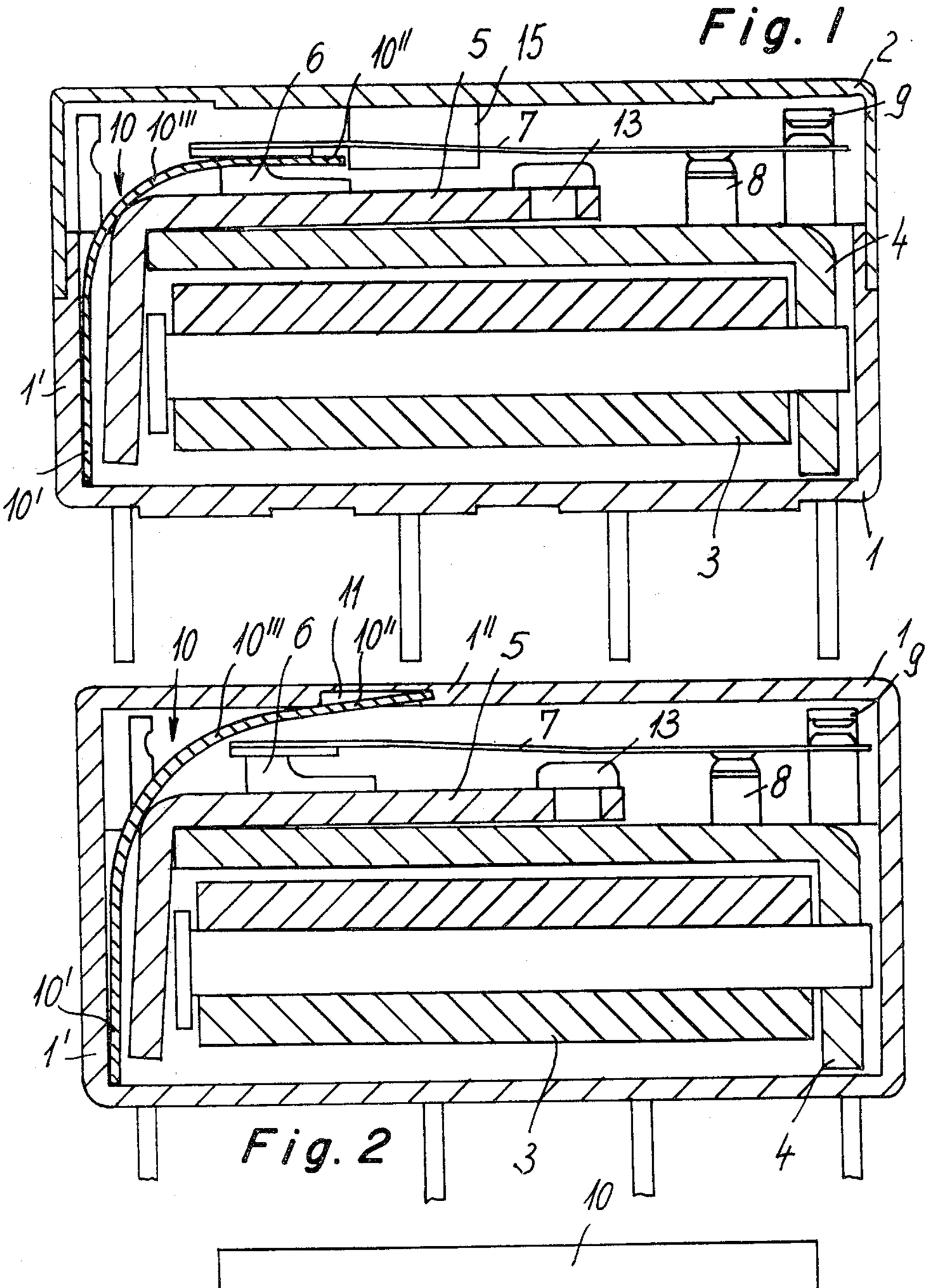


Fig. 2

Fig. 3

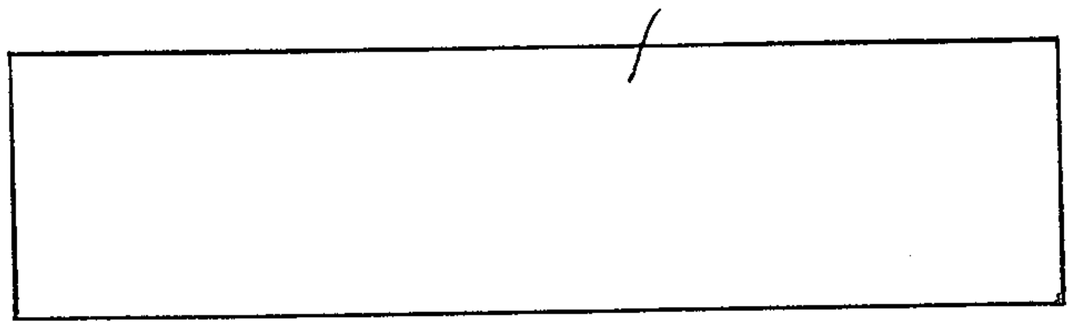


Fig. 4

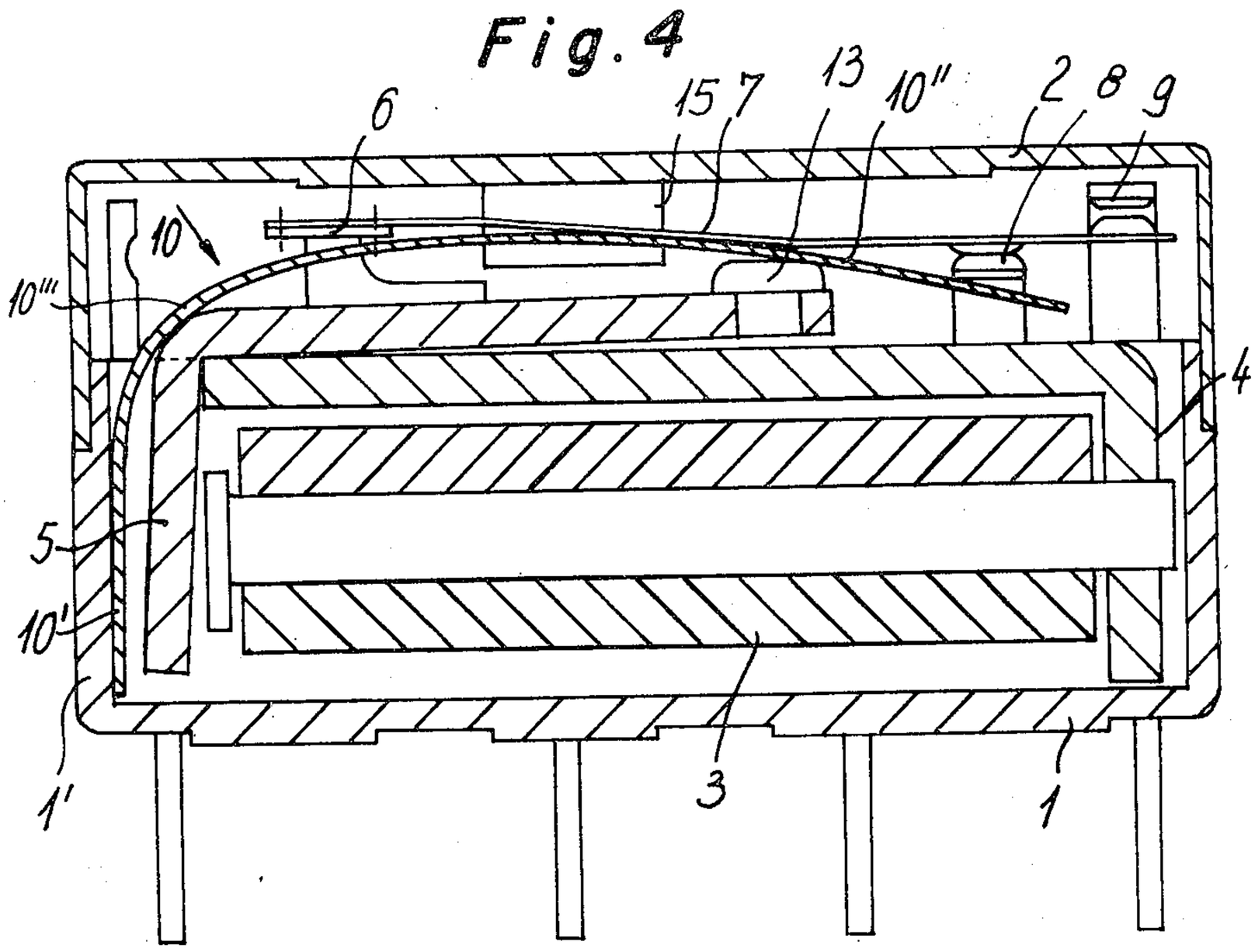
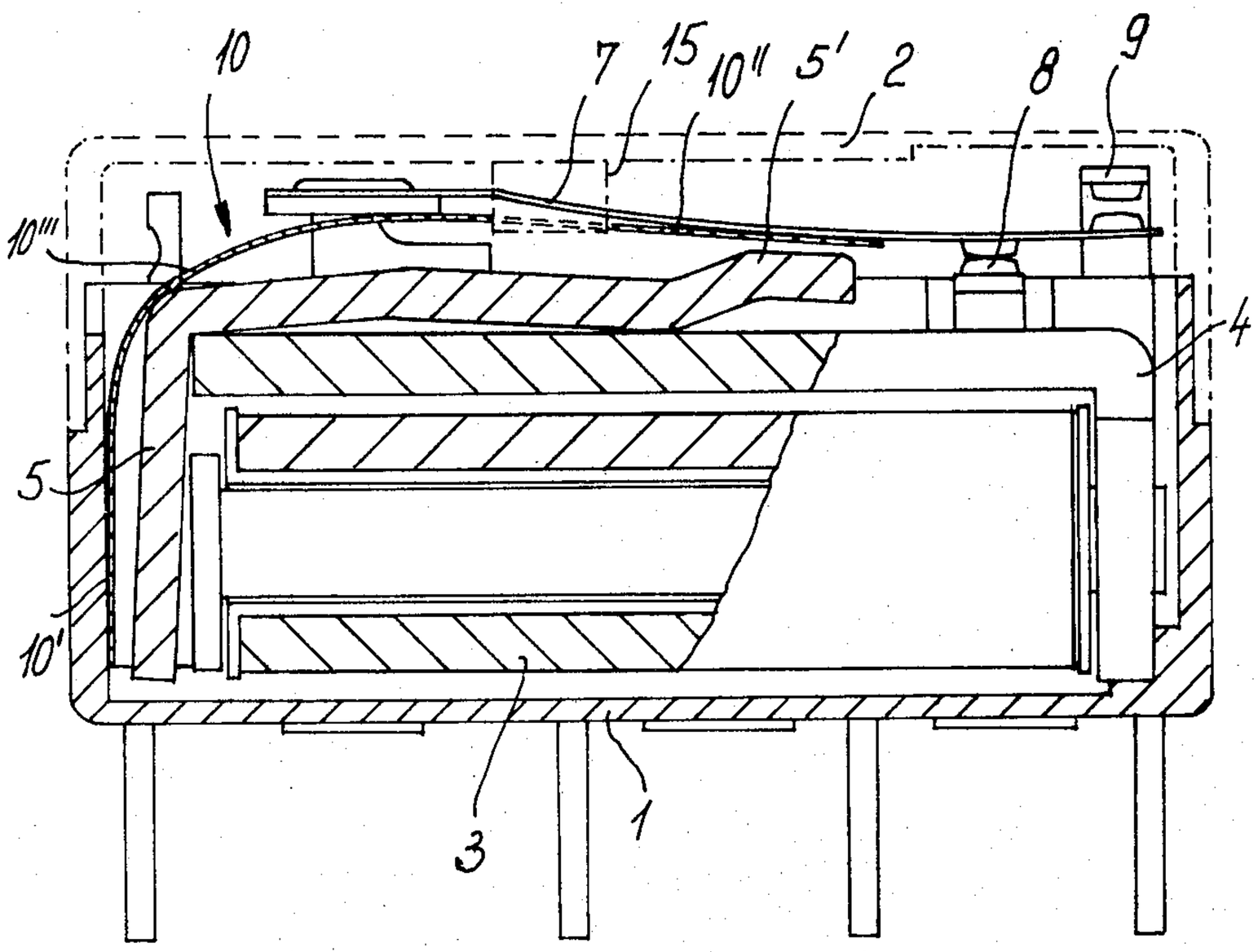


Fig. 5



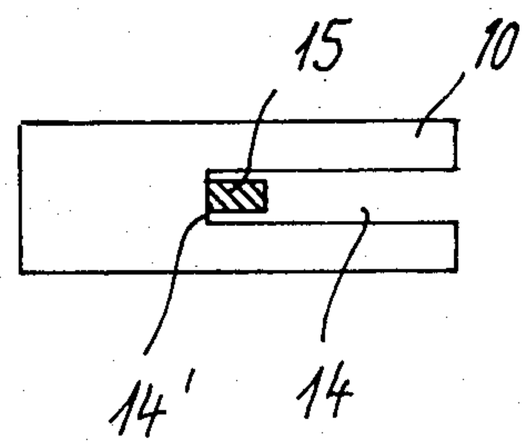


Fig. 6

MAGNETIC ARMATURE MOUNTING IN PARTICULAR FOR MINICOMPACT RELAYS

BACKGROUND OF THE INVENTION

The invention concerns a mounting for magnetic armatures, particularly for minicompact relays with a housing comprising the magnetic coil with the magnetic yoke, the magnetic armature and the spring bank, wherein the magnetic armature is angled and held tiltably at the magnetic yoke by the force of a spring.

In known relays, a magnetic armature is held against a magnetic yoke by means of flat metal springs. The flat springs are fixedly connected with the magnetic armature and/or the magnetic yoke. It is also known to hold the magnetic armature on the armature bearing by means of helical springs supported by their ends facing away from the armature on the housing. Aside from the fact that the holding springs of the known relays require a substantial effort for their assembly, they cannot satisfy the condition of reduced size relays, because of the need to observe electrical distances between conducting parts. Furthermore, the known holding springs have an interfering torque effect on the magnetic armature.

SUMMARY OF THE INVENTION

It is an object of this invention to provide an armature mounting which is simple in design and capable of holding the magnetic anchor on the armature mounting free of torque.

The object is attained according to the invention by means of a bent, flat spring strip, freely insertable, supported under prestress with its front ends on the walls of the housing or on a wall, respectively and on a switching or contact spring holder, and abutting with its bending apex against the armature. Preferably, the spring strip is made of an elastic synthetic material, for example, a section of a sheet. It is within the scope of the invention to make the strip of another material, for example, a metal. With the armature mounting created in this manner, only a simple process of insertion is needed for the spring strip, whereby the magnetic armature remains safely free of torque by virtue of the pressing contact of the bending apex by way of a hinge.

Axial immobilization of the spring strip was found to be appropriate in the design of the magnetic armature mounting. For this purpose, the spring strip may be guided by one or both ends in a slit of the housing wall, or it may be supported on shoulders, projections or the like, of the walls of the housing.

Simple axial fixation of the spring strip in relays with a housing closable by means of a cover may also be obtained by supporting the spring strip, for example, with one end of the wall of the housing and with the other end on a shoulder integral with the cover, or the like. In relays with a plurality of the contact springs arranged adjacent to each other, the integral projection of the cover may protrude between the contact springs and into the housing.

According to a preferred embodiment of the magnetic armature mounting, the spring strip is supported at one of its ends on a wall of the housing and at the other end on the contact spring or the contact spring and its holder and/or a switch spring or its holder, respectively, while the bending apex holds the magnetic armature against the magnetic yoke with prestressing. The spring strip thus provides, in addition to its holding function in relation to the magnetic armature, an electric separation of the magnetic armature and the switch spring by means of its insulating properties.

A further feature is to let the spring strip with its end facing the switch spring protrude into the path of rotation of the magnetic armature, thus effecting the actuation of the switch spring by means of the magnetic armature, directly or indirectly through the action of a tappet. In this manner it may be possible to eliminate the actuating tappet bridging the galvanic insulation between the magnetic armature and the switch spring.

In a further development of the concept of the invention, the spring strip may be secured in the relay housing by providing a slit or recess in the end of the spring strip facing the switch springs and supporting the spring strip with the surfaces outlining the slit or recess on a shoulder arranged, for example, on the cover or the like, of the relay housing. In minicompact relays with at least two switch springs. The slit or recess is approximately provided in the area between the switch springs.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a relay in cross section with a magnetic armature mounting;

FIG. **2** is a relay in cross section with a magnetic armature mounting of modified design;

FIG. **3** is a top ivew of a spring strip;

FIG. **4** is a sectional view of a relay with a magnetic armature mounting according to another embodiment;

FIG. **5**, is a sectional view of a relay showing another mounting for the magnetic armature; and

FIG. **6** is a top view of a spring strip, reduced to scale.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. **1** the housing **1** is open on top and may be closed by means of a cover **2**. The housing **1** encases a magnetic coil **3** and a magnetic yoke **4**. An angled magnetic armature **5** is supported tiltingly on the magnetic yoke **4**, said magnetic armature, by means of a projection **13**, a switch spring **7** mounted on a support **6**, so that when a voltage is applied to the magnetic coil **3**, the switch spring **7** lifts off the contact **8** and contacts the contact **9**. For the purpose of the tilting mounting of the magnetic armature **5** on the magnetic yoke **3**, a bent, flat spring strip **10** (FIG. **3**), made of a synthetic material, is inserted into the housing **1**. The spring strip **10** in this example is supported with one end **10'** abutting the wall **1'** and with its other end **10''** on the support **6**, while the concave side of the apex **10'''** rests under prestress and free of torque on the armature **5**. The spring strip **10** abuts for the purpose of axial fixation with the front side of the end **10'** against the lower corner area of the wall **1'** and with the other end against a shoulder **15** of the cover **2**.

FIG. **2** shows a relay with a circumferentially closed housing **1**. In the housing **1**, there are again contained, from one side, the magnetic coil **3** with the magnetic yoke **4**, the magnetic armature **5**, contact spring **7**, and contacts **8**, **9**. In this relay also a bent, flat spring strip **10** is used, which, however, in this case is supported at its ends. The spring strip **10** may thereby rest with its ends **10'**, **10''** on the walls **1'** and **1''** or may be engaged in slits **11** and may be locked, for example unilaterally, in said slits **11**.

In the relay of FIG. **4**, a spring strip **10** of greater length is provided on the magnetic yoke **4** for the tiltable fastening of the magnetic armature **5**, said spring

strip extending into the space between the magnetic armature **5** and the switch spring **7** and abutting the switch spring **7** and the support **6** for the switch spring **7**, and/or a contact support, respectively. The spring strip **10**, in addition to its function as the holding member for the magnetic armature **5**, acts with its end **10''** as an insulating layer to separate electrically the magnetic armature and the switch springs. When the magnetic armature **5** is tilted, in the example of FIG. **4**, the end **10''** of the spring strip **10** is bent by means of the actuating tappet **13** and the switch spring **7** is thus actuated.

In the relay of FIG. **5**, the end **10''** projects into the space between the switch spring **7** and the magnetic armature **5** and abuts the switch spring support **6** and the switch spring **7**. The magnetic armature **5** in this relay has a projection **5'**, which acts to actuate the switch spring **7** by way of the end **10''**, when the magnetic coil **3** is energized. In the relay of FIG. **5**, the actuating tappet is eliminated. In the area between the switch spring **7**, the end **10''** of the spring strip **10** (FIG. **6**) is provided with a slit **14**, into which a shoulder integral with the cover, projects. By supporting the outlining surfaces **14'** on the shoulder **15**, the spring strip **10** is immobilized in the housing **1**.

We claim:

1. Magnetic armature mounting, in particular for minicompact relays having a housing encasing a magnetic coil, a magnetic yoke, a magnetic armature and a contact spring and wherein the magnetic armature is generally L-shaped and is held with its inside angle tiltably positioned against an edge of the yoke, the improvement comprising: a bent, flat spring strip in said housing, said spring strip abutting under at one end against one of the walls of the housing, and at another end against means in said housing, and with the concave side of its bent apex bearing against the magnetic armature opposite said inside angle to thereby hold said armature tiltably against said yoke without applying torque thereto.

2. Magnetic armature mounting according to claim **1**, wherein the spring strip consists of an elastic synthetic material.

3. Magnetic armature mounting according to claim **1**, wherein the spring strip is made of a metallic material.

4. Magnetic armature mounting according to claim **1**, wherein the spring strip is guided in a slit of the housing wall.

5. Magnetic armature mounting according to claim **1**, wherein the spring strip is axially immobilized by supporting it on shoulders on the walls of the housing.

6. Magnetic armature mounting according to claim **1**, wherein the housing is closed with a separate cover, the spring strip being supported for axial immobilization with one end against a wall of the housing and with the other end against a projection or the like, secured to the cover.

7. An armature mounting as defined in claim **1** wherein said other end of said spring strip projects into the path of movement of a portion of said armature and is flexed thereby upon tilting movement of said armature.

8. Magnetic armature mounting according to claim **7**, wherein the spring strip projects with its end abutting the switch spring into the rotating path of the magnetic armature and that said end of the spring strip may be flexed by the magnetic armature.

9. Magnetic armature mounting according to claim **7** or **8**, wherein an end of the spring strip has a slit with an end surface of said slit abutting a shoulder fixed relative to the housing whereby the spring strip is immobilized.

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